

Housing Standards, Social Group, and Respiratory Infections in Children of Upernavik, Greenland

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During one year, contacts with the health service due to respiratory infections—including diseases of ear, nose, and throat—were studied in the 310 children of Upernavik town. 166 contacts were recorded. Children from low socio-economic groups had been expected to have a higher overall contact rate than other children, but this did not prove to be so. The disease pattern of these children was characterized by a low level of contacts due to certain acute respiratory infections and a high level of contacts due to chronic purulent otitis media, compared with children from higher socio-economic groups. The differences did not reach statistical significance, however.

The material presented is part of an epidemiological survey of the population of Upernavik town during 1979-80. Upernavik is the administrative centre of the district of Upernavik, the northernmost district in West Greenland, inhabited by 2089 people on January 1st, 1980, according to official statistics. The town of Upernavik, with a population of 844, is situated on a small island at 72°47' N.

The investigation was undertaken to evaluate the impression the author experienced in his daily work as district medical officer, i.e. that people from the lower socio-economic groups were seen more often in the surgery, and suffering from more serious diseases, than the rest of the population.

As measure of socio-economic status, housing standard and social grouping was chosen. A number of studies show that poor housing conditions and low social class are associated with high morbidity of respiratory infections in children (3, 9, 12), but few studies have been performed in the Arctic.

In an investigation from Southwest Greenland, Berg & Adler-Nissen (2) concluded that people with

poor housing conditions had more episodes of common cold and otitis than people with good housing conditions, but that the percentage of people with at least one episode of these diseases was the same irrespective of housing conditions. As regards tonsillitis, no association between morbidity and housing condition was observed.

Hobart (5) investigated the association between socio-economic factors and morbidity in children from arctic Canada. An association was observed between increased morbidity due to all causes and variables such as poor housing quality, lack of central heating, and lack of tap water in the house.

MATERIAL AND METHODS

The population which formed the basis of the study was those children of Upernavik town aged 0-14 on October 1st 1979 and children born during the period of study. The population was defined according to official lists and the files of the hospital. Children of temporary workers and visitors were not included in the study.

From April 1, 1979 until March 31, 1980 all contacts of the population with the health service of Upernavik were recorded. Final diagnoses were determined and coded according to "Praksis sygdoms klassifikation" (PSK) (8), which is a Danish system for classifying diseases intended for use by general practitioners.

Information on housing conditions and social conditions was collected using the official files, supplemented by unstructured interviews and the knowledge of the interpreter. Information on housing conditions comprised size of house, housing density, heating installation, and water supply. Information on social conditions comprised age, sex, and ethno-cultural group of individuals and size and social group of households. For social classification, the system of the Institute for Social Research in Copenhagen was used (4), groups I-III as well as groups IV-V being combined because of the small number of children in each group.

The ethno-cultural classification of the population as Greenlander/Dane did not present any difficulties, as everyone was known personally. The official classification into those born inside Greenland and those born out-

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side was not used. Children whose father and mother were classified differently were classified as Danes.

Morbidity was registered as the incidence of new disease episodes, i.e. number of contacts due to new episodes of disease per child in the population during the year of study, including also the first contact on account of chronic disease.

Total contact rate was the number of all contacts per child in the population during the year of study.

Respiratory infections were defined as acute or chronic diseases of the ear, nose, throat, or respiratory tract, judged by clinical observation to be infectious. Bacteriological tests could not be performed.

Chronic purulent otitis media was defined as a chronic or recurrent condition with purulent discharge through a perforated drum.

STATISTICS

The χ^2 -test or exact tests of the Fisher type were used as appropriate. When analysing variables such as number of new episodes of disease, due allowance was made for the fact that disease episodes do not occur independently of a child's previous history. It can be shown that if the distribution of such a variable has a standard deviation = k times the one expected under the independence assumption (Poisson model), then the χ^2 for comparison of subgroups equals the usual χ^2 based on count of persons, divided by k^2 . This property was exploited where appropriate. (Details omitted as none of the tests reached statistical significance.)

RESULTS

The total population numbered 836 persons, 737 Greenlanders and 99 Danes. Of these, 310 were children aged 0-14, 266 Greenlanders and 44 Danes. 6% were less than 1 year old, 31% were 1-6 years old, and 63% were 7-14 years old.

Among the 310 children, 79 had 123 recorded new episodes of respiratory infection. The total number of contacts was 166, i.e. 156 out-patient consultations and 10 admissions to hospital. Thus the proportion of children with at least one episode 0.25, incidence of new episodes 0.40, total contact rate 0.54, the values being expressed per child in the entire population and per year.

Acute tonsillitis was by far the predominant cause of illness, both as regards number of new episodes, accounting for 41%, and total number of contacts, accounting for 36%. Acute purulent otitis media made up 7% of new episodes and 5% of all contacts. Other acute respiratory infections comprised 39% of new episodes and 34% of all contacts and included common cold, acute pharyngitis, sinusitis, pneumonia, acute serous otitis media, and

influenza. The only chronic disease observed was chronic purulent otitis media which was the cause of 13% of new episodes and 25% of all contacts.

HOUSING CONDITIONS

The housing conditions of the Greenlandic inhabitants of Upernavik town have improved considerably during recent decades, but are still far below the Danish standard. In Denmark the average size of dwellings in 1980, according to official statistics, was 107 m² compared with 59 m² in Upernavik town. Housing density in Denmark was 43 m² per inhabitant compared with only 13 m² in Upernavik and whereas in Denmark 93% of inhabitants had central heating and nearly 100% tap water in the house, this was the case for only 64% and 51% respectively of the Greenlanders of Upernavik. The average housing standard of the inhabitants of Upernavik is similar to that of Greenlanders as a whole, according to official statistics of 1976.

The 266 Greenlandic children were divided into three groups according to housing standard and analysed as shown in Table I. In housing standard group 3, no episodes of acute purulent otitis media were observed. The incidence of new episodes of other respiratory infections was low in this group. The incidence of new episodes of chronic purulent otitis media was similar to that of housing standard group 2, while this disease was not observed at all in housing standard group 1. The overall contact rate due to chronic otitis was very high in housing standard group 3, accounting for one-half of all contacts. However, these trends did not reach statistical significance.

Considering all causes, the proportion of children with at least one episode was similar in the three groups, but the incidence of new episodes was lower in housing standard group 3 than in the other two groups (though not statistically significant, $0.20 < p < 0.30$). The overall contact rate, however, was similar.

SOCIAL GROUPS

52% of the Greenlandic children and 93% of the Danish children belonged to social groups I-III. 10 Greenlandic children could not be classified within either social group and were excluded from subsequent consideration.

Table 1. Medical examinations due to respiratory infections distributed according to housing standard group. Values are per child living under specified housing conditions and per year

Housing standard group ^a	Acute tonsillitis	Acute purulent otitis media	Other acute infections	Chronic purulent otitis media	All causes
<i>Group 1 (N=43)</i>					
Proportion of children with at least one episode	0.12	0.05	0.19	0	0.30
Incidence of new episodes	0.19	0.05	0.19	0	0.42
Overall contact rate	0.26	0.05	0.21	0	0.51
<i>Group 2 (N=162)</i>					
Proportion of children with at least one episode	0.09	0.02	0.15	0.06	0.25
Incidence of new episodes	0.15	0.03	0.19	0.06	0.43
Overall contact rate	0.17	0.03	0.24	0.14	0.58
<i>Group 3 (N=61)</i>					
Proportion of children with at least one episode	0.15	0	0.08	0.07	0.25
Incidence of new episodes	0.15	0	0.08	0.07	0.30
Overall contact rate	0.18	0	0.08	0.26	0.52

^a Group 1 were children living in houses with more than 15 m² per inhabitant, central heating and tap water. Group 3, children living in houses with 10 m² or less per inhabitant, with an oil- or coal-fired stove, and without tap water. Group 2, the remaining children.

Table II shows that in social groups IV-V the incidence of new episodes of acute purulent otitis media was lower than in groups I-III. The incidence of new episodes of chronic purulent otitis media was higher than in groups I-III, and the overall contact rate due to this disease was high, accounting for 40 % of all contacts in the group. The trends are not statistically significant. Thus, the entire otitis pattern was essentially the same irrespective of whether subdivision was done according to housing standard or social group. Regarding acute tonsillitis and other acute infections, no difference was observed between social groups.

Considering all causes, the proportion of children with at least one episode and the incidence of new episodes was similar in social groups I-III and IV-V, but the total contact rate was higher in social groups IV-V.

For the sake of completeness it should be noted that the Danish children had a higher reported incidence of new episodes of acute tonsillitis than the

Greenlandic, a lower incidence of new episodes of other acute respiratory infections, and an incidence of new episodes of acute and chronic purulent otitis media similar to that of Greenlandic children.

DISCUSSION

Arctic populations are small and data sparse. The best possible use should be made of the few data available and it is therefore considered justified to comment on the trends observed, despite the fact that they were not statistically significant.

The overall contact rate was not higher in the low socio-economic groups, contrary to the original impressions of the author. The incidence of new episodes was slightly lower, especially in housing standard group 3.

A common disease pattern was observed in the low socio-economic groups, i.e. a low level of certain acute respiratory infections, including acute

Table II. Medical examinations due to respiratory infections distributed according to social group. Values are per child in the social group and per year

Social group	Acute tonsillitis	Acute purulent otitis media	Other acute infections	Chronic purulent otitis media	All causes
<i>Groups I-III (N=138)</i>					
Proportion of children with at least one episode	0.12	0.04	0.15	0.02	0.28
Incidence of new episodes	0.17	0.04	0.17	0.03	0.41
Overall contact rate	0.17	0.04	0.22	0.04	0.48
<i>Groups IV-V (N=118)</i>					
Proportion of children with at least one episode	0.09	0.01	0.13	0.07	0.24
Incidence of new episodes	0.14	0.01	0.14	0.07	0.36
Overall contact rate	0.20	0.01	0.16	0.25	0.63
<i>Danes (N=44)</i>					
Proportion of children with at least one episode	0.14	0.02	0.07	0.05	0.23
Incidence of new episodes	0.23	0.02	0.09	0.05	0.39
Overall contact rate	0.25	0.02	0.09	0.05	0.41

purulent otitis media, and a high level of chronic purulent otitis media. Furthermore, each episode of the latter led to considerably more contacts in children from low socio-economic groups.

In a number of countries, respiratory infections have been shown to be more common in children living in poor housing conditions, compared with other children (3, 9, 13). In Southwest Greenland, too, an association was observed between poor housing conditions and a high morbidity due to certain acute respiratory infections (2). In that study, however, morbidity rates were calculated not exclusively from case records, as in the present study, but also from interviews. The discrepancy between the two studies might thus be explained by a higher iatrotropic threshold in children from lower socio-economic groups, possibly due to language and cultural barriers.

In Scandinavia, the incidence of acute purulent otitis media was shown to be high in children from modern apartment flats compared with older ones (12), and high in children from a suburb with modern single-family houses compared with both modern and older flats (6). Climate and housing quality

is, however, very different in Greenland and Scandinavia, and the consequences of poor dwelling conditions cannot be expected to be identical.

Otitis media has been shown to be much more common in Greenland than in Denmark and to be a major cause of hearing deficiency (10). It has been shown to play an important role in impairing verbal development in Alaskan Eskimo children (7), but the prevalence of both acute and chronic otitis media was considerably higher in Alaskan, Canadian, and Greenlandic children 10-20 years ago than in Upernavik today (1, 7, 10, 11).

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